

EXERCISES

For more practice, see *Extra Practice*.

Practice and Problem Solving

A Practice by Example x^2 **Algebra** Fill in the reason that justifies each step.

Examples 1 and 2
(page 90)

1. Solve for x .

$$m\angle CDE + m\angle EDF = 180$$

$$x + (3x + 20) = 180$$

$$4x + 20 = 180$$

$$4x = 160$$

$$x = 40$$

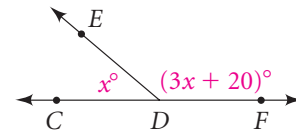
a. ?

b. ?

c. ?

d. ?

e. ?



2. Solve for n .

Given: $XY = 42$

$$XZ + ZY = XY$$

$$3(n + 4) + 3n = 42$$

$$3n + 12 + 3n = 42$$

$$6n + 12 = 42$$

$$6n = 30$$

$$n = 5$$

a. ?

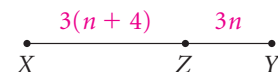
b. ?

c. ?

d. ?

e. ?

f. ?



x^2 **Algebra** Give a reason for each step.

3. $\frac{1}{2}x - 5 = 10$ Given

$$2\left(\frac{1}{2}x - 5\right) = 20$$

$$x - 10 = 20$$

$$x = 30$$

a. ?

b. ?

c. ?

4. $5(x + 3) = -4$ Given

$$5x + 15 = -4$$

$$5x = -19$$

$$x = -\frac{19}{5}$$

a. ?

b. ?

c. ?

Example 3
(page 91)

Name the property that justifies each statement.

5. $\angle Z \cong \angle Z$

7. If $12x = 84$, then $x = 7$.

9. If $m\angle A = 15$, then $3m\angle A = 45$.

11. If $3x + 14 = 80$, then $3x = 66$.

13. If $2x + y = 5$ and $x = y$, then $2x + x = 5$.

14. If $AB - BC = 12$, then $AB = 12 + BC$.

15. If $\angle 1 \cong \angle 2$ and $\angle 2 \cong \angle 3$, then $\angle 1 \cong \angle 3$.

6. $2(3x + 5) = 6x + 10$

8. If $\overline{ST} \cong \overline{QR}$, then $\overline{QR} \cong \overline{ST}$.

10. $XY = XY$

12. If $KL = MN$, then $MN = KL$.

B Apply Your Skills

Use the given property to complete each statement.

16. Addition Property of Equality

If $2x - 5 = 10$, then $2x = \underline{\hspace{1cm}}$.

18. Symmetric Property of Equality

If $AB = YU$, then $\underline{\hspace{1cm}}$.

20. Reflexive Property of Congruence

$\angle PQR \cong \underline{\hspace{1cm}}$

22. Substitution Property

If $LM = 7$ and $EF + LM = NP$, then $\underline{\hspace{1cm}} = NP$.

17. Subtraction Property of Equality

If $5x + 6 = 21$, then $\underline{\hspace{1cm}} = 15$.

19. Symmetric Property of Congruence

If $\angle H \cong \angle K$, then $\underline{\hspace{1cm}} \cong \angle H$.

21. Distributive Property

$3(x - 1) = 3x - \underline{\hspace{1cm}}$



Need Help?

For Exercise 25, you may want to review naming segments and angles (pp. 18 and 27).



23. Transitive Property of Congruence
If $\angle XYZ \cong \angle AOB$ and $\angle AOB \cong \angle WYT$, then $\underline{\quad ? \quad}$.
24. Multiplication Property of Equality
If $\frac{1}{3}TR = UW$, then $\underline{\quad ? \quad}$.
25. **Writing** Jero claims that the statements $\overline{LR} \cong \overline{RL}$ and $\angle CBA \cong \angle ABC$ are both true by the Reflexive Property of Congruence. Explain why Jero is correct.
26. Use what you know about transitive properties to complete the following:
The Transitive Property of Falling Dominoes:
If domino A causes domino B to fall, and domino B causes domino C to fall, then domino A causes domino $\underline{\quad ? \quad}$ to fall.



27. **Algebra** Fill in the reason that justifies each step.

Given: C is the midpoint of \overline{AD} .

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$$AC = CD$$

$$4x = 2x + 12$$

$$2x = 12$$

$$x = 6$$

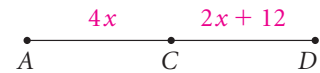
a. $\underline{\quad ? \quad}$

b. $\underline{\quad ? \quad}$

c. $\underline{\quad ? \quad}$

d. $\underline{\quad ? \quad}$

e. $\underline{\quad ? \quad}$



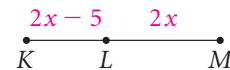
Reading Math

For help with reading and solving Exercise 28, see p. 95.



28. **Algebra** In the figure at the right, $KM = 35$.

- a. Solve for x . Justify each step.
b. Find the length of \overline{KL} .



29. **Algebra** In the figure at the right, $m\angle GFI = 128$.

- a. Solve for x . Justify each step.
b. Find $m\angle EFI$.



30. **Algebra** Fill in the reason that justifies each step.

Given: \overrightarrow{BC} bisects $\angle ABD$.

\overrightarrow{BC} bisects $\angle ABD$.

$$m\angle ABC = m\angle CBD$$

$$6n + 1 = 4n + 19$$

$$2n = 18$$

$$n = 9$$

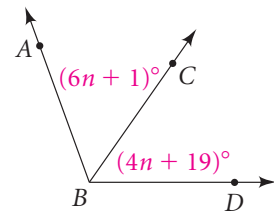
a. $\underline{\quad ? \quad}$

b. $\underline{\quad ? \quad}$

c. $\underline{\quad ? \quad}$

d. $\underline{\quad ? \quad}$

e. $\underline{\quad ? \quad}$



Challenge

31. **Error Analysis** The steps below “show” that $1 = 2$. Find the error.

Given: $a = b$

$$a = b$$

$$ab = b^2$$

$$ab - a^2 = b^2 - a^2$$

$$a(b - a) = (b + a)(b - a)$$

$$a = b + a$$

$$a = a + a$$

$$a = 2a$$

$$1 = 2$$

Given

Multiplication Property of Equality

Subtraction Property of Equality

Distributive Property

Division Property of Equality

Substitution Property

Simplify.

Division Property of Equality

Relationships You know that the relationships “is equal to” and “is congruent to” are reflexive, symmetric, and transitive. In a later chapter, you will see that this is also true for the relationship “is similar to.” Consider the following relationships among people. State whether each relationship is reflexive, symmetric, transitive, or none of these.

Sample: The relationship “is younger than” is transitive. If Sue is younger than Fred and Fred is younger than Alana, then Sue is younger than Alana. The relationship “is younger than” is not reflexive because Sue is not younger than herself. It is also not symmetric because if Sue is younger than Fred, Fred is not younger than Sue.



32. has the same birthday as

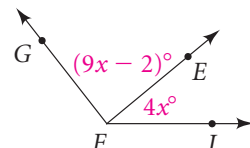
33. is taller than

34. lives in the same state as
different state than

35. lives in a

36. is the same height as
descendant of

37. is a



Standardized Test Prep

Multiple Choice

38. Which property justifies this statement?

If $4x = 16$, then $16 = 4x$.

- A. Multiplication Property of Equality
- B. Transitive Property of Equality
- C. Reflexive Property of Equality
- D. Symmetric Property of Equality

Quantitative Comparison

Compare the boxed quantity in Column A with the boxed quantity in Column B. Choose the best answer.

- A. The quantity in Column A is greater.
- B. The quantity in Column B is greater.
- C. The two quantities are equal.
- D. The relationship cannot be determined from the information given.

Column A

Column B

39.

area of a circle with
diameter 6 cm

area of a circle with
radius 6 cm

40.

perimeter of a square
with 4-in. sides

perimeter of a rectangle
with a pair of 4-in. sides

41.

area of a rectangle with
base 12 cm and height 5 cm

area of a square with
6 cm sides



Take It to the NET

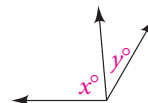
Online lesson quiz at
www.PHSchool.com

Web Code: afa-0204

Short Response

42. In the diagram, $x = 2y + 15$ and $x + y = 120$.

- a. Use a Property of Equality to explain why $3y + 15 = 120$.
- b. Solve for y . Justify each step. Then find the value of x .



Mixed Review

Lesson 2-3

Reasoning Use logical reasoning to draw a conclusion.

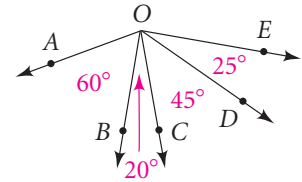
43. If a student is having difficulty in class, then that student's teacher is concerned.
Elena is having difficulty in history class.
44. If a person has a job, then that person is earning money.
If a person is earning money, then that person can save money each week.

Lesson 1-4

Use the diagram at the right and find each measure.

45. $m\angle AOC$ 46. $m\angle AOD$
47. $m\angle DOB$ 48. $m\angle BOE$

49. In the diagram, name an obtuse angle and a right angle.



Lesson 1-1

Find the next two terms in each sequence.

50. 19, 21.5, 24, 26.5 51. 3.4, 3.45, 3.456, 3.4567
52. -2, 6, -18, 54 53. 8, -4, 2, -1